1 - DRAFT

June 1, 1993

THE WORLD TRADE CENTER

Backup Emergency Radio Frequency (RF) Telephone
and Public Address System

Scope: Develop a wireless backup emergency telephone and public address system throughout the World Trade Center complex. The system is intended for use in a disaster for which the hard wired primary communication systems have been damaged or otherwise rendered inoperable.

Function: The wireless backup emergency telephone and public address system shall be a "stand alone" system with the capability to establish two-way telephone communication with any number of telephones and to transmit a public address announcement to any number of public address speakers, all being accomplished on separate channels, separately or simultaneously. Each system device, e.g., telephone, public address speaker and control units shall be powered from self contained rechargeable batteries; all being capable of full load operation for a period of twenty (20) hours without recharging.

Component Location

1. Sub Master and Master Control Units (Figure #1)

a) A "Sub Master Control Unit" shall be installed in each Sky Lobby Security Console (T/A and T/B - 44 and 78). Each unit will control

telephone and public address functions for the building zone above.

b) A "Master Control Unit" shall be installed in each Main Lobby Security Console (T/A and T/B Concourse - Elev. 310'). These units will have the primary responsibility for telephone and public address functions within the first zone of the buildings. In addition, these units will have the capability to assume the functions of the Sky Lobby Sub Master Control Units in the event that the Sky Lobby Security Consoles are abandoned and for off hour service. Each "Master Control Unit" shall be readily removable from the Security Console for the purpose of field use within five hundred (500) feet of the World Trade Center perimeter boundaries.

2. Radio Telephone (Figure 2)

A fixed radio telephone shall be installed on each re-entry floor in the corridor adjacent to Stair "B". The phone shall be housed in a surface mounted enclosure with a nonlockable hinged cover (color and service identification to determined).

The phone enclosure shall be equipped with a handset cradle hook switch, call button, call light and audible call signal.

3. Public Address Speaker (Figure #3)

Five (5) class "E" public address speakers shall be installed on each floor as per Figure #3. The receiver/amplifier and speaker may be self contained or separated units as shown in Figure #3. Each speaker shall be capable of delivering ten (10) watts of audio power.

Sub Master and Master Control Units (Features) - Figure 1A

Sub Master and Master Control Units shall be essentially the same design. The Master Control Units shall however be designed for portable field use, excluding the printer. The Sub Master and Master Control Units shall incorporate the following minimum features:

a) Shall emit an audible and visual (red) call signal when any phone within the zone institutes a call.

b) Shall include a silence switch for the audible signal with automatic and adjustable audible signal restore circuit.

c) All calls from phones within the zone shall provide a visual signal (red) whether or not communications has been established with one or more phones.

d) Operator selectable talk circuit switches shall be provided so that communications may be established with all phones within the zone or any combination thereof which are in the off-hook position.

e) Operator selectable call switches shall be provided so that communications may be established with all phones within the zone or any combination thereof which are in the off-hook position.

e) Operator selectable call switches shall be provided to call

any phone within the zone.

f) Visual (yellow) and audible trouble (different from call) signals shall be indicated for each phone within the zone. A trouble signal shall be instituted for each phone whenever any of the following conditions occur:

1. Handset off-hook
2. AC failure to battery charger
3. Low battery voltage
4. Pilferage

g) Selector switches shall be provided to transmit public address announcements on a floor basis and "All Page" for the zone.

h) Visual (yellow) and audible (same as phone) trouble signal shall be indicated for each public address speaker within the zone if any of the following conditions occur:

1. AC failure to battery charger
2. Low battery voltage
3. Pilferage

i) A Lamp Test switch

j) Periodic "System Self Test" and appropriate diagnostic printout

k) An alphanumeric printer to record:

1. Operator name, time and date (key pad required)
2. "Trouble" or "Call", location, time and date, e.g.,

Location	Condition	Time	Date
A-052	TEL TBL	16:00:00	7 June 93
A-052	Call from	16:00:05	7 June 93
	TEL.SIL	16:00:30	7 June 93
A-052	Call to	03:05:10	8 June 93
A-052	PA TBL	01:30:01	8 June 93
A-052	PA SIL	10:21:10	8 June 93

SELF TEST

Note: The control units components and design shall be commensurate with military criteria

System Operation

1 - Call From Floor Telephone (EX: A-052)

Action	Response
- Lift Latch, Open Door (No Key required)	None
- Remove Handset	Trouble light (yellow) illuminates on "Sub Master" (A-044) and "Master" (Elev. 310) including audible trouble signal. Printer A-044 and A-310 records "TEL TBL A-052, time and date

- Press "Call" Button	Call light (red) illuminates on "Sub Master" (A-044) and "Master" (Elev. 310) including audible "Call" signal. Printer A-044 and A-310 records "Call" A-052, time and date
- Operator A-044 sets telephone switch (A-052) to "Talk"	Trouble and call lights and audible signal extinguish. Communication is established.
- Multiple "Calls" instituted from zone	Trouble and call lights illuminate incl. audible signals. Printer records all data. Operator continues conversation with first call and presses "(TEL) TBL SIL." {Maximum silence = 2 minutes} Operator answers all calls in an appropriate manner, individually or by group.

NOTE: All "Sub Master" actions and responses are to be duplicated at the Concourse (Elev. 310) "Master" Control for the purpose of off hour monitoring or a situation for which the Sub Master is abandoned.

2. Call From Sub Master (A-044) to Floor Phone (A-052)

Action	Response
- Operator presses call button on Sub Master for A-052	Printer records "Call To" A-052, time and date. Telephone call light illuminates and audible signal emitted on floor phone.
- Person on A-052 opens box and removes handset.	Printer records "TEL TBL," time and date. Operator sets switch to "Talk" and establishes communications. "TEL TBL"

extinguished.

NOTE: All "Sub Master" actions and responses are to be duplicated at the Concourse (Elev. 310) "Master" Control for the purpose of off hour monitoring or a situation for which the Sub Master is abandoned.

2A. Call from Master (A-310) to Floor Phone (A-052)

Action	Response
- Operator presses call button on Sub Master for A-052	Printer records "Call To" A-052, time and date. Telephone call light illuminates and audible signal emitted.
- Person on A-052 opens box and removes handset.	Printer records "TEL TBL," time and date. Operator sets switch to "Talk" and establishes communications. "TEL TBL" extinguished.

3. Public Address Announcement

a) Sub Master Control Unit (A/B - 044 and 078) operator may select by switch to page individual floors or all floors within the zone.

b) The Master Control Unit (A/B Concourse, Elev. 310) operator may

select by switch to page individual floors or all floors within the building.

Related Topics

- Location of Operations Control Center (OCC)

- Function of OCC with respect to Master Control Unit at Concourse (Elev. 310) Security Console

- Use of Emergency Radio Frequency (RF) Telephone and Public Address System in Sub Grade Levels and Four and Five World Trade Center

- Internal vs. external RF signal paths

- Other types of signal paths

1. Where will the OCC be located?

2. Should the OCC have the ability of taking control of the Concourse (Elev. 310) Master Control Units?

3. Should sub-grade levels be included in this system, e.g., the Master Control Unit A-310 serves all of the sub-grade "J" areas, while B-310 serves all of the sub-grade "K" areas? Should we address 4 and 5 WTC?

4. Signal paths may be internal, i.e., within the structures or external

i.e., signals transmitted from a building other than One and Two WTC. Regardless of the signal method employed, the signal path must be fail-safe and comply with all National and New York City Standards. For the purpose of discussion the following signal paths might be considered:

- Internal radiax cable system Fig. #4 BREAK IN LINE
- External RF path Fig. #5
- Laser Beam Fig. #6

5. Superimposing an RF or DATA signal on a portion of the electrical power distribution system should also be explored. POWER LOSS BREAK IN TRANSMISSION LINES

COMPONENT LOCATION

SUB-MASTER & MASTER CONTROL UNIT

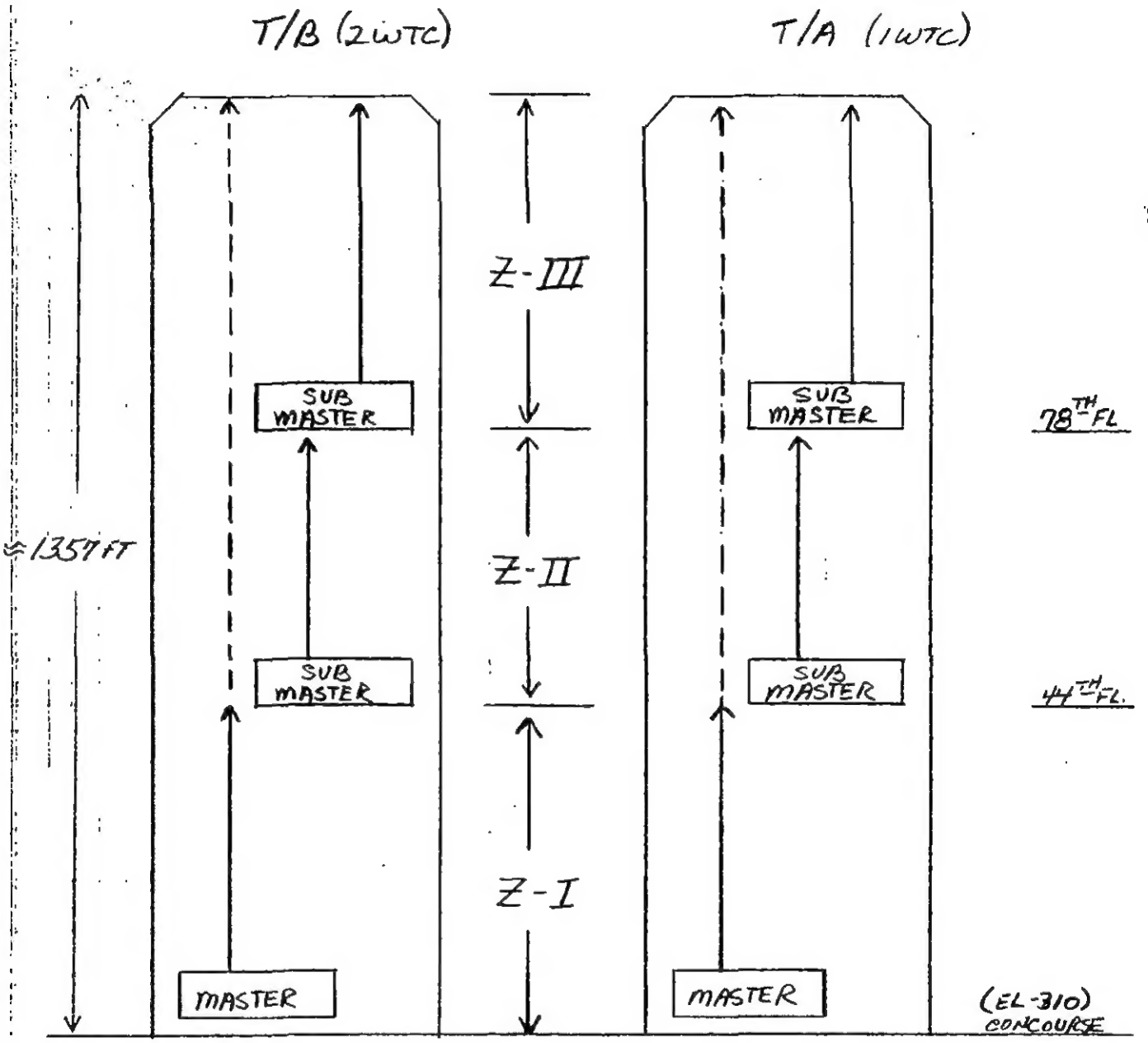


FIG #1

COMPONENT LOCATION

SUB MASTER & MASTER CONTROL UNIT (CONCEPT)

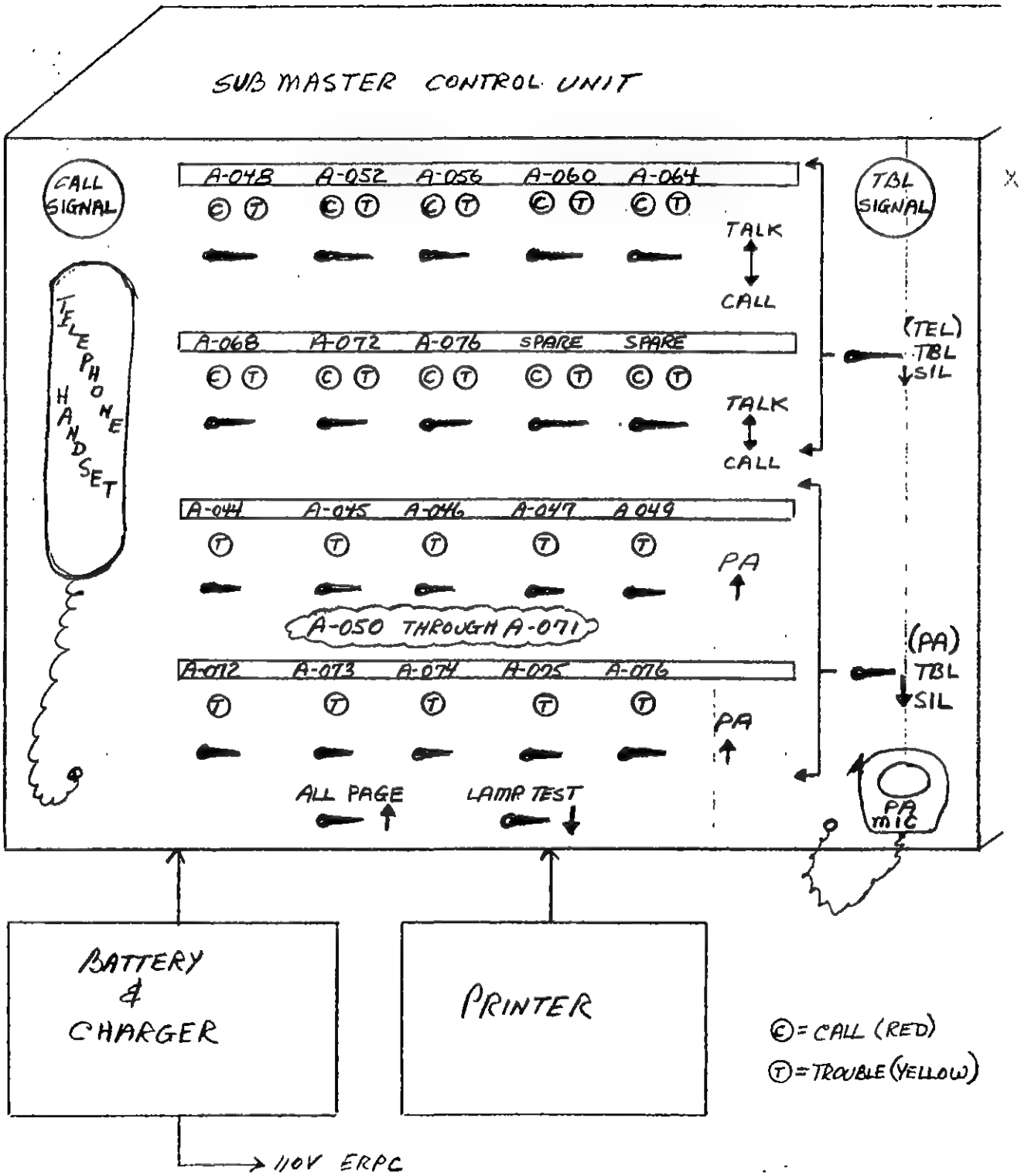
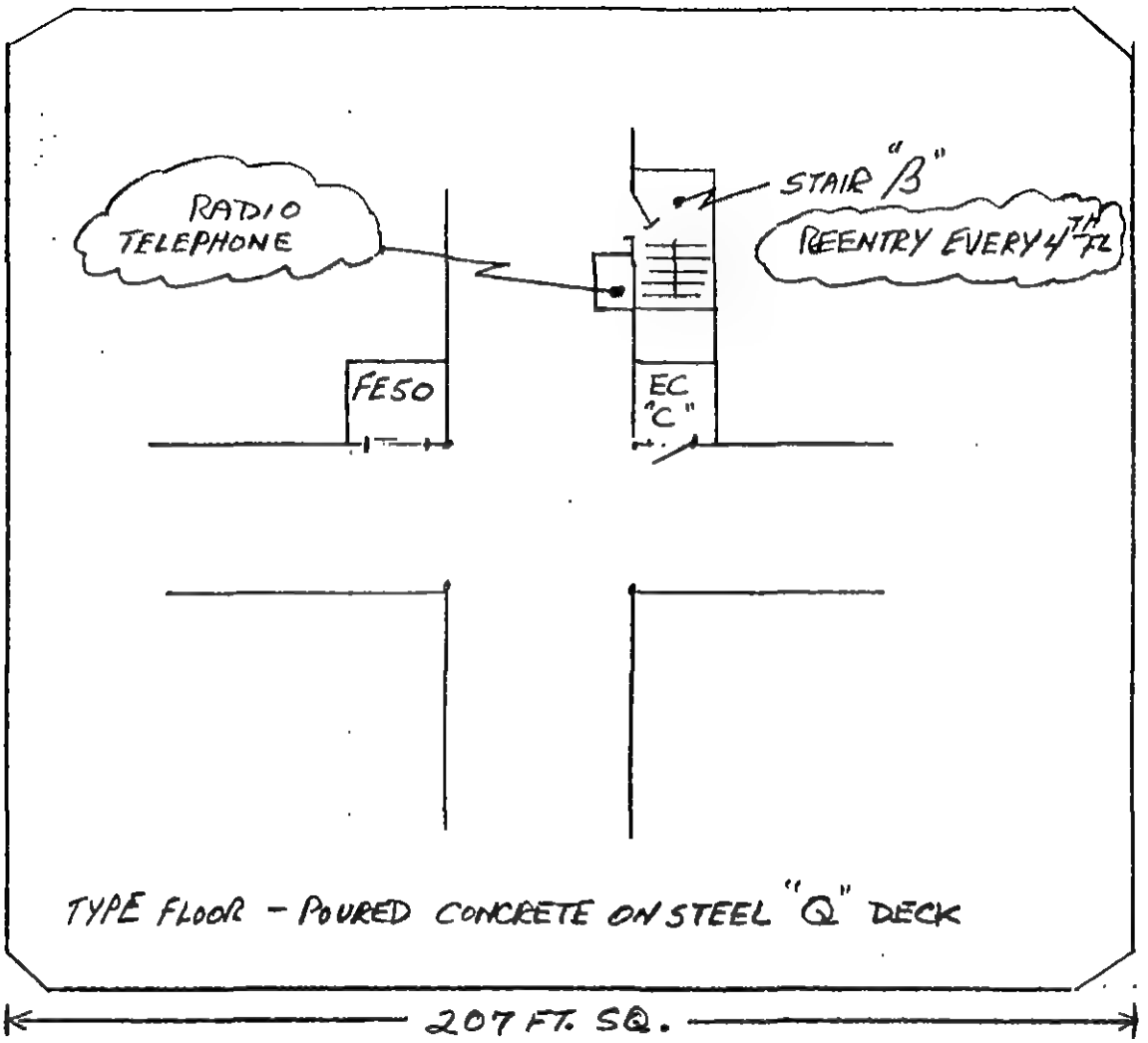


FIG #1A

COMPONENT LOCATION

RADIO TELEPHONE



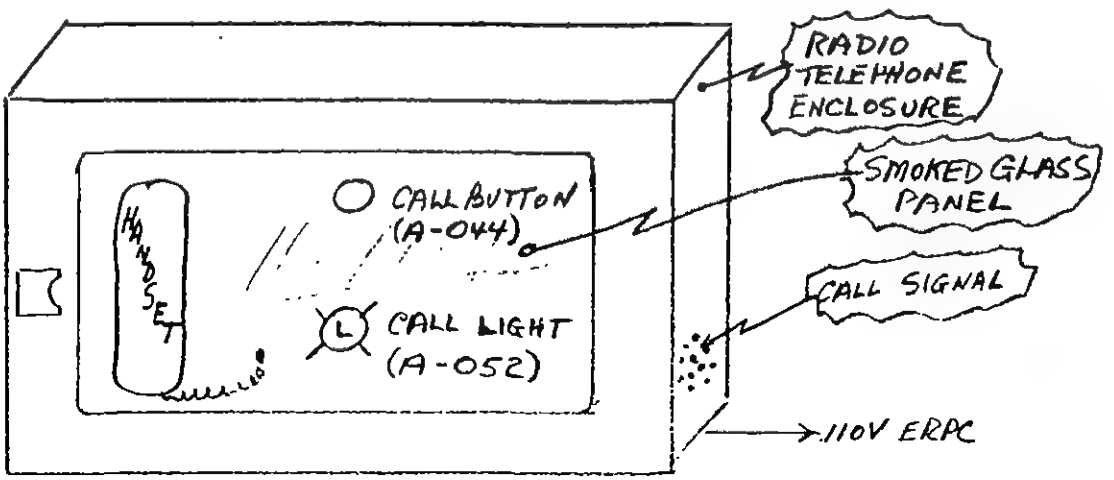


FIG #2

SIGNAL PATH

EXTERNAL RF FROM 5 OR 7 WTC

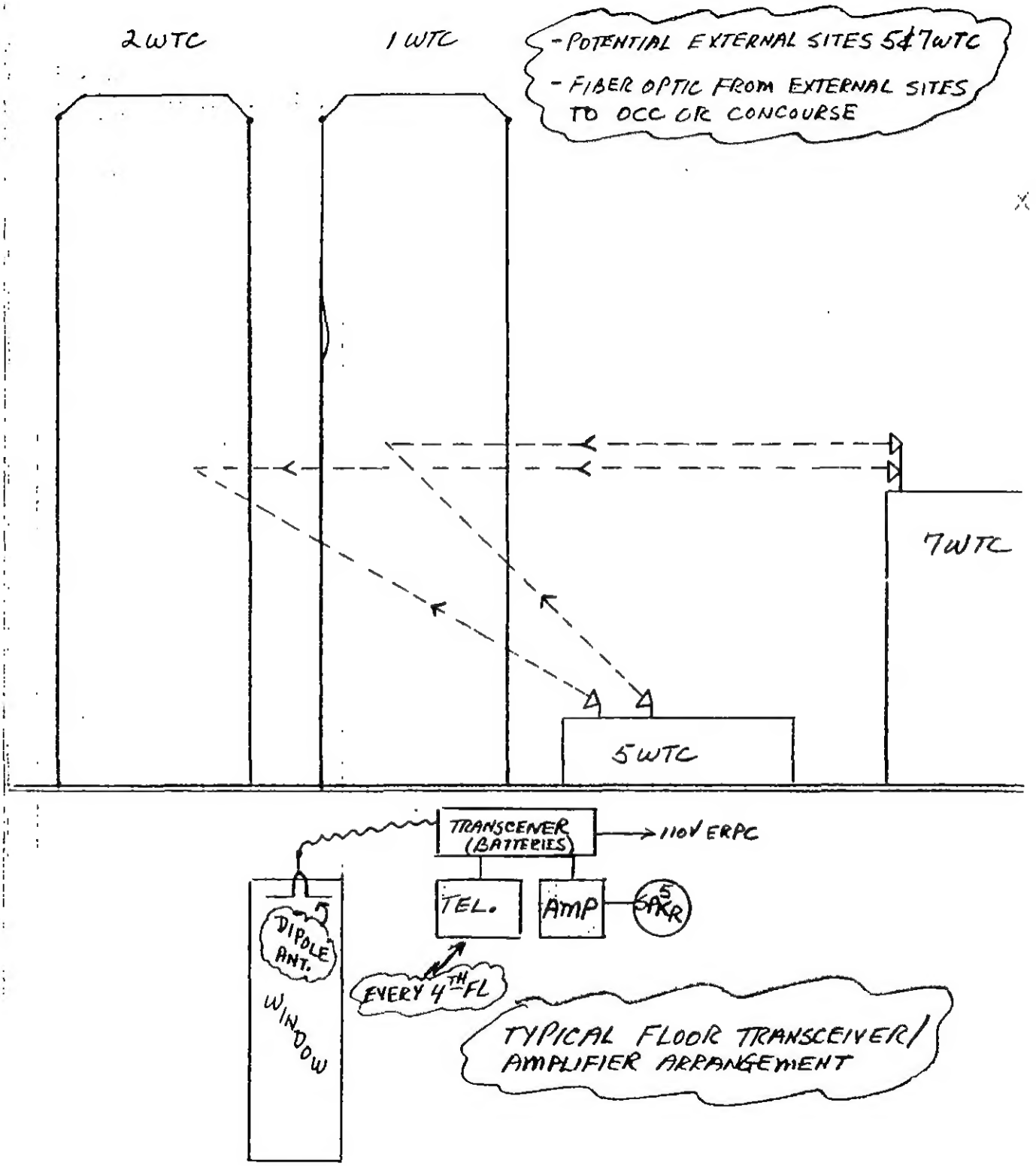
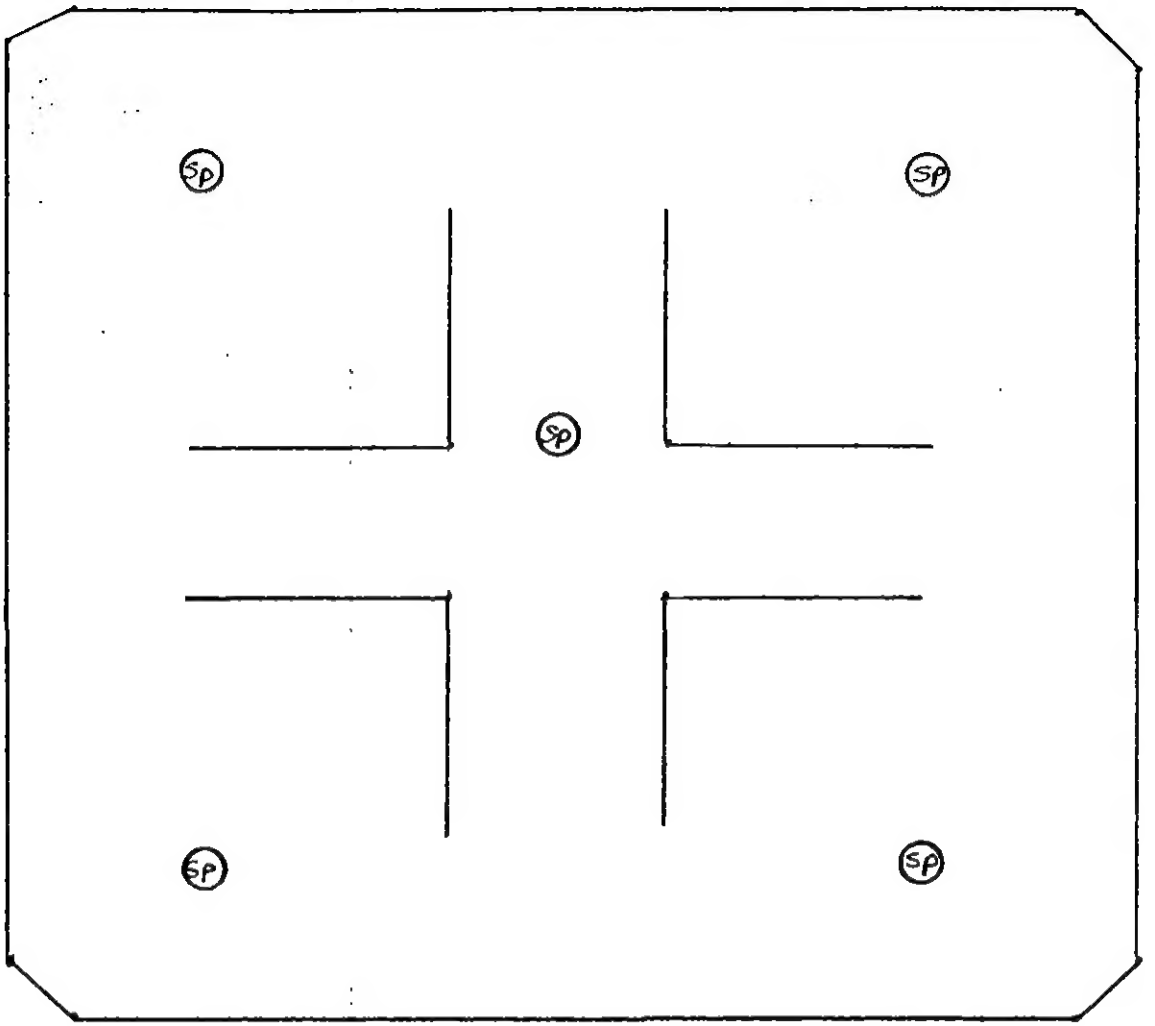


FIG #5

COMPONENT LOCATION

PUBLIC ADDRESS SPEAKER



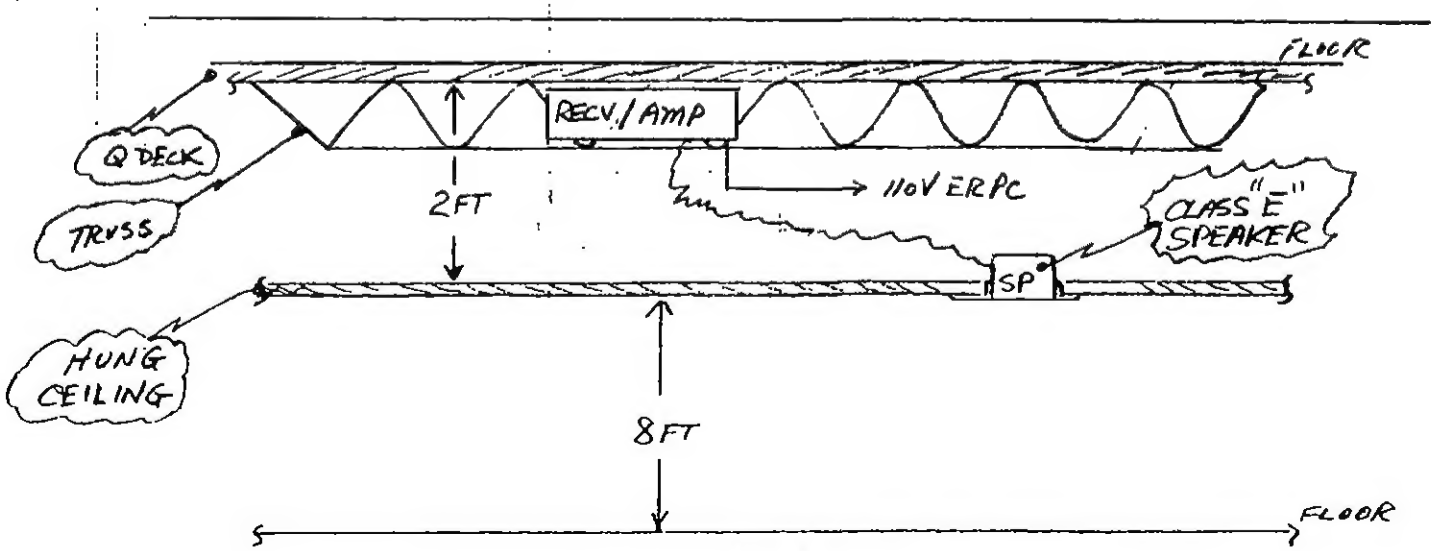


FIG #3

SIGNAL PATH

INTERNAL RADIAX CABLE

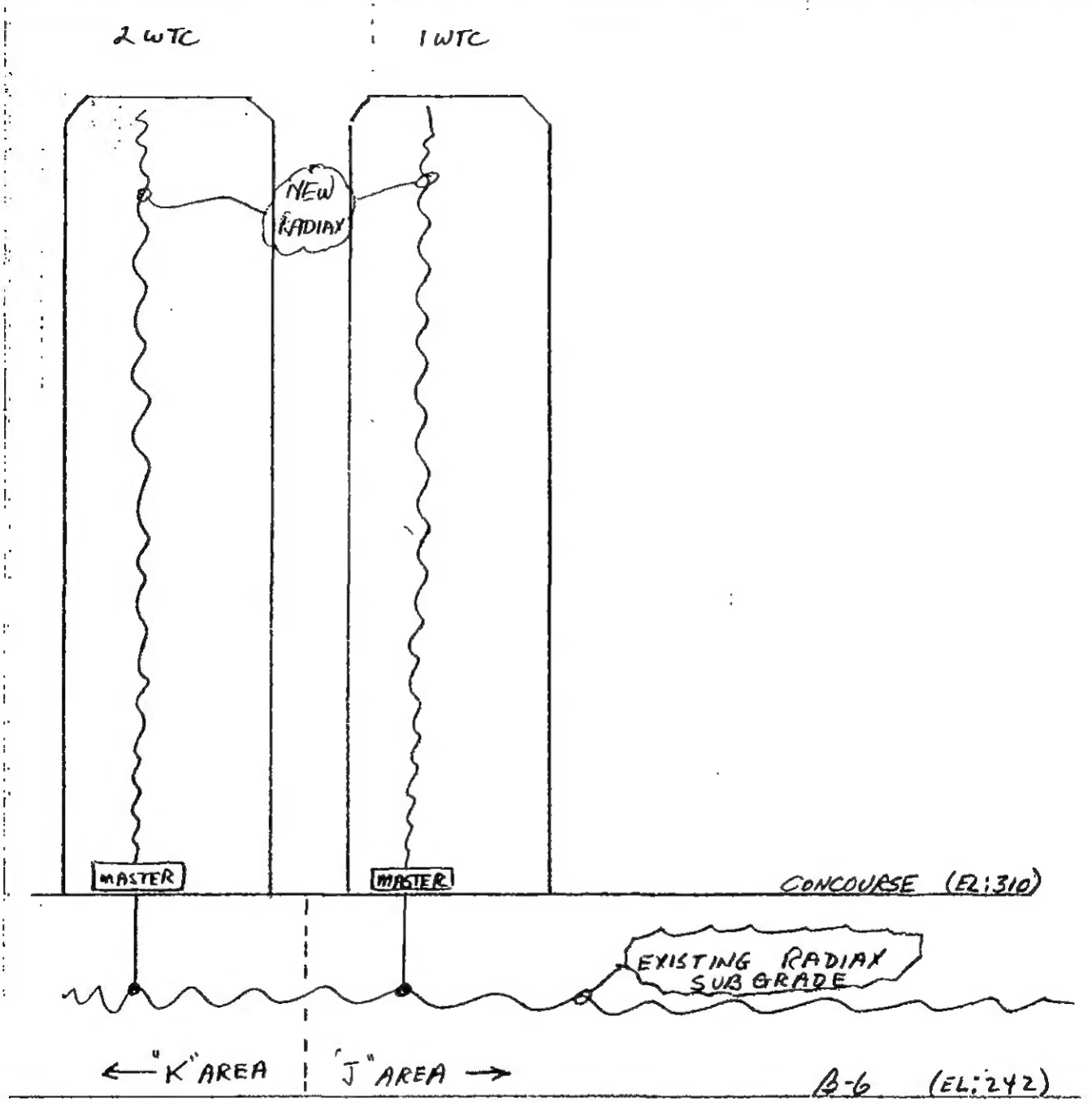


FIG #4

SIGNAL PATH

EXTERNAL LASER BEAM FROM 7WTC

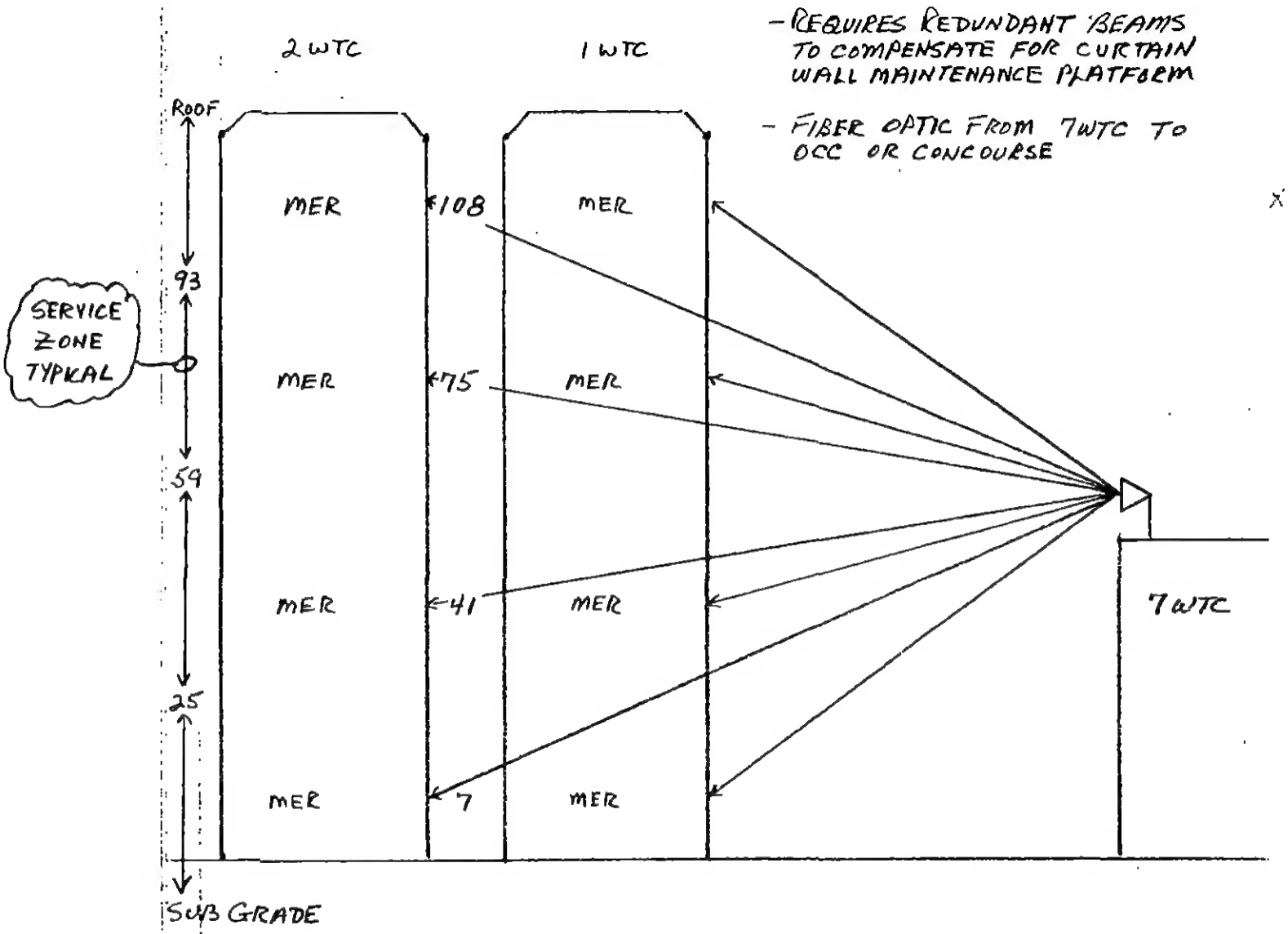


FIG #6